



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 7, 2020 – 02:00 PM BST

PDB ID : 1SZ2  
Title : Crystal structure of E. coli glucokinase in complex with glucose  
Authors : Lunin, V.V.; Li, Y.; Schrag, J.D.; Iannuzzi, P.; Matte, A.; Cygler, M.  
Deposited on : 2004-04-02  
Resolution : 2.20 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.13.1  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.13.1

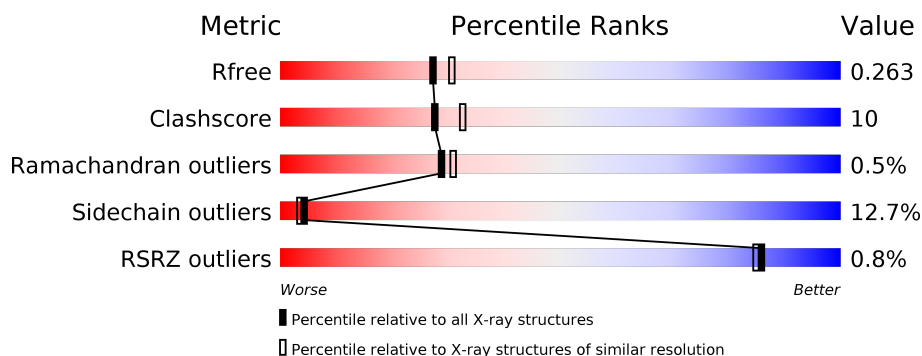
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.20 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	332	<div> <div>%</div> <div> <div></div> <div>69%</div> <div>23%</div> <div>• • •</div> </div> </div>
1	B	332	<div> <div>%</div> <div> <div></div> <div>69%</div> <div>23%</div> <div>5% •</div> </div> </div>

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 5294 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Glucokinase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	319	Total	C	N	O	S	Se	0	5	0
			2452	1572	422	445	6	7			
1	B	320	Total	C	N	O	S	Se	0	7	0
			2470	1582	433	443	6	6			

There are 34 discrepancies between the modelled and reference sequences:

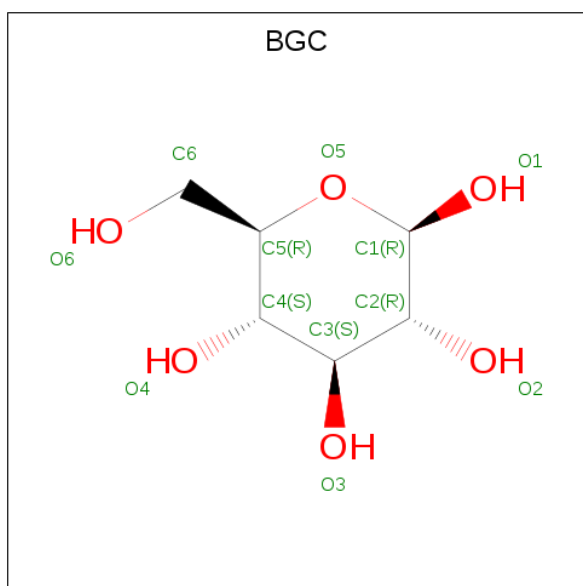
Chain	Residue	Modelled	Actual	Comment	Reference
A	-10	MSE	-	modified residue	UNP P0A6V8
A	-9	GLY	-	cloning artifact	UNP P0A6V8
A	-8	SER	-	cloning artifact	UNP P0A6V8
A	-7	SER	-	cloning artifact	UNP P0A6V8
A	-6	HIS	-	expression tag	UNP P0A6V8
A	-5	HIS	-	expression tag	UNP P0A6V8
A	-4	HIS	-	expression tag	UNP P0A6V8
A	-3	HIS	-	expression tag	UNP P0A6V8
A	-2	HIS	-	expression tag	UNP P0A6V8
A	-1	HIS	-	expression tag	UNP P0A6V8
A	0	GLY	-	cloning artifact	UNP P0A6V8
A	1	SER	-	cloning artifact	UNP P0A6V8
A	74	MSE	MET	modified residue	UNP P0A6V8
A	86	MSE	MET	modified residue	UNP P0A6V8
A	106	MSE	MET	modified residue	UNP P0A6V8
A	110	MSE	MET	modified residue	UNP P0A6V8
A	241	MSE	MET	modified residue	UNP P0A6V8
B	-10	MSE	-	modified residue	UNP P0A6V8
B	-9	GLY	-	cloning artifact	UNP P0A6V8
B	-8	SER	-	cloning artifact	UNP P0A6V8
B	-7	SER	-	cloning artifact	UNP P0A6V8
B	-6	HIS	-	expression tag	UNP P0A6V8
B	-5	HIS	-	expression tag	UNP P0A6V8
B	-4	HIS	-	expression tag	UNP P0A6V8
B	-3	HIS	-	expression tag	UNP P0A6V8

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-2	HIS	-	expression tag	UNP P0A6V8
B	-1	HIS	-	expression tag	UNP P0A6V8
B	0	GLY	-	cloning artifact	UNP P0A6V8
B	1	SER	-	cloning artifact	UNP P0A6V8
B	74	MSE	MET	modified residue	UNP P0A6V8
B	86	MSE	MET	modified residue	UNP P0A6V8
B	106	MSE	MET	modified residue	UNP P0A6V8
B	110	MSE	MET	modified residue	UNP P0A6V8
B	241	MSE	MET	modified residue	UNP P0A6V8

- Molecule 2 is beta-D-glucopyranose (three-letter code: BGC) (formula: C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total	0	0
			12 C O		
2	B	1	Total	0	0
			12 C O		

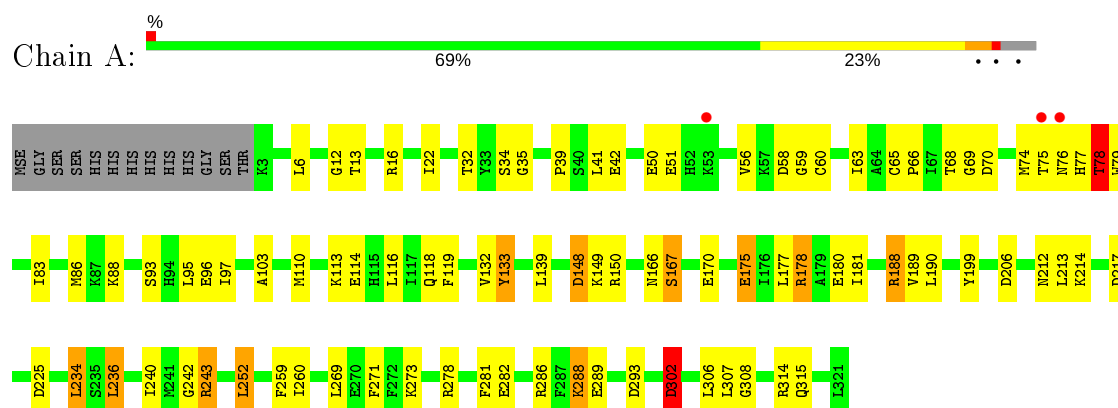
- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	196	Total	0	0
			196 O		
3	B	152	Total	0	0
			152 O		

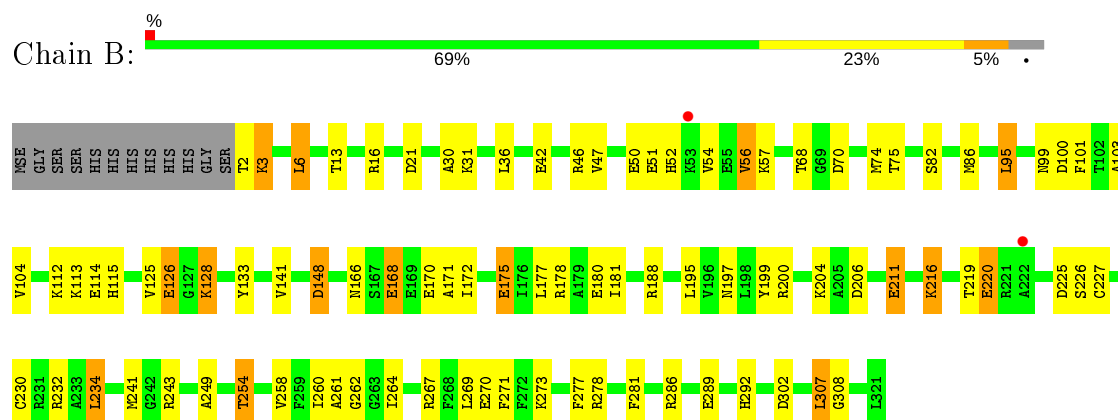
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

#### • Molecule 1: Glucokinase



#### • Molecule 1: Glucokinase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	78.42Å 53.54Å 90.90Å 90.00° 112.99° 90.00°	Depositor
Resolution (Å)	50.00 – 2.20 44.52 – 2.20	Depositor EDS
% Data completeness (in resolution range)	89.5 (50.00-2.20) 89.5 (44.52-2.20)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.05	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.69 (at 2.20Å)	Xtriage
Refinement program	REFMAC 5.1.08	Depositor
R, $R_{free}$	0.193 , 0.265 0.194 , 0.263	Depositor DCC
$R_{free}$ test set	1606 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	43.1	Xtriage
Anisotropy	0.332	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 45.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.014 for h,-k,-h-l	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	5294	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	48.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.44% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: BGC

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	A	0.72	0/2520	0.92	11/3401 (0.3%)
1	B	0.68	0/2552	0.88	6/3442 (0.2%)
All	All	0.70	0/5072	0.90	17/6843 (0.2%)

There are no bond length outliers.

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	225	ASP	CB-CG-OD2	7.62	125.16	118.30
1	B	148	ASP	CB-CG-OD2	6.78	124.40	118.30
1	A	286	ARG	NE-CZ-NH2	-6.71	116.94	120.30
1	A	243	ARG	NE-CZ-NH2	-6.65	116.97	120.30
1	B	70	ASP	CB-CG-OD2	6.30	123.97	118.30
1	A	293	ASP	CB-CG-OD2	6.07	123.76	118.30
1	B	307	LEU	CA-CB-CG	6.04	129.20	115.30
1	A	288	LYS	CD-CE-NZ	6.02	125.55	111.70
1	B	100	ASP	CB-CG-OD2	5.97	123.67	118.30
1	A	206	ASP	CB-CG-OD2	5.91	123.62	118.30
1	B	21	ASP	CB-CG-OD2	5.79	123.51	118.30
1	A	302[A]	ASP	CB-CG-OD2	5.56	123.31	118.30
1	A	302[B]	ASP	CB-CG-OD2	5.56	123.31	118.30
1	A	70	ASP	CB-CG-OD2	5.53	123.27	118.30
1	A	78	THR	C-N-CA	5.35	135.08	121.70
1	A	252	LEU	CA-CB-CG	5.15	127.14	115.30
1	B	206	ASP	CB-CG-OD2	5.12	122.90	118.30

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2452	0	2461	52	0
1	B	2470	0	2488	48	0
2	A	12	0	12	0	0
2	B	12	0	12	0	0
3	A	196	0	0	13	4
3	B	152	0	0	6	1
All	All	5294	0	4973	99	4

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 10.

All (99) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:302[B]:ASP:OD1	3:A:1142:HOH:O	1.72	1.07
1:B:170:GLU:CD	1:B:243:ARG:HH22	1.69	0.95
1:B:170:GLU:OE2	1:B:243:ARG:NH2	2.05	0.89
1:B:112[B]:LYS:HD2	1:B:115:HIS:CE1	2.09	0.87
1:A:288:LYS:HE2	3:A:1014:HOH:O	1.74	0.87
1:A:170:GLU:OE2	1:A:243:ARG:NH2	2.08	0.86
1:B:172:ILE:HA	1:B:175:GLU:HG3	1.59	0.84
1:B:47:VAL:O	1:B:51:GLU:HB2	1.81	0.81
1:A:68:THR:HG22	1:A:69:GLY:N	1.95	0.81
1:A:167:SER:HB3	3:A:1109:HOH:O	1.80	0.80
1:A:170:GLU:CD	1:A:243:ARG:HH22	1.85	0.80
1:B:126:GLU:HB3	3:B:2037:HOH:O	1.80	0.80
1:B:216:LYS:HG2	3:B:2007:HOH:O	1.84	0.78
1:A:39:PRO:HG2	3:A:1194:HOH:O	1.85	0.77
1:A:178:ARG:O	1:A:181:ILE:O	2.03	0.76
1:B:86:MSE:HE2	1:B:95:LEU:HD11	1.68	0.74
1:B:16[B]:ARG:HE	1:B:30:ALA:HB1	1.53	0.74
1:B:86:MSE:CE	1:B:95:LEU:HD11	2.18	0.72
1:A:167:SER:CB	3:A:1109:HOH:O	2.41	0.66
1:B:166:ASN:HB2	1:B:243:ARG:CZ	2.26	0.66
1:A:181:ILE:HB	3:A:1096:HOH:O	1.94	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:236:LEU:CD2	1:A:240:ILE:HD11	2.28	0.64
1:A:177:LEU:O	1:A:181:ILE:HG13	1.97	0.64
1:A:188:ARG:HD3	3:A:1013:HOH:O	1.98	0.63
1:B:171:ALA:O	1:B:175:GLU:HG2	1.98	0.63
1:B:249:ALA:HA	1:B:254:THR:HB	1.80	0.62
1:A:288:LYS:NZ	3:A:1163:HOH:O	2.34	0.60
1:A:118:GLN:NE2	3:A:1197:HOH:O	2.35	0.59
1:B:286:ARG:HD2	3:B:2105:HOH:O	2.03	0.59
1:B:104:VAL:HG11	1:B:261:ALA:HB2	1.85	0.58
1:A:68:THR:CG2	1:A:69:GLY:N	2.64	0.57
1:B:177:LEU:O	1:B:181:ILE:HG13	2.06	0.56
1:A:148:ASP:O	1:A:149:LYS:HB2	2.06	0.55
1:B:114:GLU:CD	1:B:114:GLU:H	2.08	0.55
1:A:236:LEU:HD23	1:A:240:ILE:HD11	1.88	0.55
1:B:178:ARG:O	1:B:181:ILE:O	2.25	0.55
1:A:35:GLY:C	1:A:77:HIS:HE1	2.11	0.54
1:A:139:LEU:HD22	1:A:190:LEU:HB2	1.88	0.54
1:A:68:THR:HG22	1:A:69:GLY:H	1.72	0.54
1:A:214:LYS:O	1:A:217:ASP:HB2	2.08	0.54
1:B:254:THR:O	1:B:254:THR:CG2	2.55	0.53
1:A:282:GLU:O	1:A:288:LYS:HE3	2.08	0.53
1:A:42:GLU:HB2	1:A:86:MSE:HE2	1.90	0.53
1:B:170:GLU:OE1	1:B:243:ARG:NH2	2.42	0.52
1:A:16:ARG:HG2	1:A:306:LEU:HD11	1.91	0.52
1:A:16:ARG:HD3	1:A:32:THR:OG1	2.10	0.52
1:A:288:LYS:HD3	3:A:1127:HOH:O	2.09	0.52
1:B:103:ALA:O	1:B:308:GLY:HA3	2.11	0.51
1:B:6:LEU:HB2	1:B:56:VAL:HG21	1.93	0.51
1:A:34:SER:N	3:A:1092:HOH:O	2.22	0.51
1:B:216:LYS:O	1:B:220:GLU:HB3	2.12	0.50
1:B:125:VAL:O	1:B:128:LYS:HB2	2.11	0.50
1:B:254:THR:HG21	1:B:258:VAL:HG22	1.94	0.50
1:B:31[B]:LYS:HZ2	1:B:51:GLU:CD	2.15	0.49
1:A:119:PHE:O	1:A:278:ARG:HD3	2.13	0.49
1:A:133:TYR:O	1:A:260:ILE:HA	2.13	0.49
1:A:170:GLU:CD	1:A:243:ARG:NH2	2.62	0.48
1:A:234:LEU:HD13	1:A:271:PHE:CD2	2.49	0.48
1:B:216:LYS:HE2	3:B:2007:HOH:O	2.13	0.48
1:B:42:GLU:OE2	1:B:46[B]:ARG:NH2	2.41	0.47
1:A:13:THR:O	1:A:35:GLY:N	2.37	0.47
1:A:79:TRP:N	3:A:1098:HOH:O	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:103:ALA:O	1:A:308:GLY:HA3	2.15	0.47
1:B:234:LEU:HD13	1:B:271:PHE:CD2	2.50	0.47
1:A:269:LEU:HG	1:A:273:LYS:HD2	1.96	0.46
1:B:31[B]:LYS:NZ	1:B:51:GLU:OE1	2.49	0.46
1:B:86:MSE:HE3	1:B:95:LEU:HD11	1.97	0.46
1:A:12:GLY:HA2	1:A:76:ASN:HB3	1.98	0.46
1:A:83:ILE:HG12	1:A:97:ILE:HG13	1.97	0.46
1:A:315:GLN:NE2	3:A:1128:HOH:O	2.46	0.45
1:A:60:CYS:HA	1:A:96:GLU:O	2.17	0.45
1:B:74:MSE:HE3	3:B:2148:HOH:O	2.17	0.45
1:B:270:GLU:OE1	1:B:273:LYS:HD3	2.17	0.45
1:A:6:LEU:O	1:A:59:GLY:HA2	2.16	0.45
1:A:58:ASP:OD1	1:A:93:SER:HB2	2.17	0.45
1:B:172:ILE:CA	1:B:175:GLU:HG3	2.40	0.45
1:A:22:ILE:O	1:A:314:ARG:HD2	2.17	0.45
1:B:264:ILE:O	1:B:267[B]:ARG:HB2	2.17	0.45
1:A:236:LEU:HD23	1:A:240:ILE:CD1	2.47	0.44
1:A:180:GLU:OE1	1:A:180:GLU:HA	2.17	0.44
1:B:99:ASN:ND2	1:B:101:PHE:H	2.15	0.44
1:A:199:TYR:CZ	1:A:213:LEU:HD12	2.54	0.43
1:B:227:CYS:HB3	1:B:230:CYS:HB2	2.01	0.43
1:B:219:THR:HG21	1:B:267[A]:ARG:HG2	2.00	0.43
1:B:3:LYS:HA	1:B:3:LYS:HD2	1.95	0.43
1:B:199:TYR:OH	1:B:211:GLU:HG3	2.18	0.43
1:A:132:VAL:HA	1:A:259:PHE:O	2.19	0.42
1:B:278:ARG:O	1:B:281:PHE:HB3	2.20	0.42
1:B:241[B]:MSE:HG2	1:B:277:PHE:CE1	2.54	0.42
1:A:242:GLY:O	1:A:281:PHE:HA	2.21	0.41
1:B:254:THR:O	1:B:254:THR:HG23	2.19	0.41
1:B:50:GLU:O	1:B:52:HIS:O	2.38	0.41
1:A:65:CYS:HB2	1:A:66:PRO:HD2	2.02	0.41
1:B:289:GLU:CD	3:B:2094:HOH:O	2.59	0.41
1:A:77:HIS:CD2	1:A:78:THR:H	2.38	0.41
1:B:133:TYR:O	1:B:260:ILE:HA	2.21	0.41
1:B:197:ASN:HD22	1:B:200:ARG:HH21	1.68	0.40
1:A:35:GLY:O	1:A:77:HIS:HE1	2.03	0.40
1:A:175[A]:GLU:HG2	1:B:168:GLU:HG3	2.03	0.40

All (4) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:1077:HOH:O	3:A:1192:HOH:O[2_555]	0.67	1.53
3:A:1067:HOH:O	3:A:1188:HOH:O[2_555]	1.60	0.60
3:A:1077:HOH:O	3:A:1092:HOH:O[2_555]	1.92	0.28
3:A:1143:HOH:O	3:B:2098:HOH:O[1_455]	1.94	0.26

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	322/332 (97%)	306 (95%)	15 (5%)	1 (0%)	41	46
1	B	325/332 (98%)	308 (95%)	15 (5%)	2 (1%)	25	26
All	All	647/664 (97%)	614 (95%)	30 (5%)	3 (0%)	29	31

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	78	THR
1	B	262	GLY
1	B	148	ASP

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	257/257 (100%)	223 (87%)	34 (13%)	4	3
1	B	260/257 (101%)	226 (87%)	34 (13%)	4	3

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	517/514 (101%)	449 (87%)	68 (13%)	<b>4</b> <b>3</b>

All (68) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	41	LEU
1	A	50	GLU
1	A	51	GLU
1	A	56	VAL
1	A	63	ILE
1	A	74[A]	MSE
1	A	74[B]	MSE
1	A	75	THR
1	A	78	THR
1	A	88[A]	LYS
1	A	88[B]	LYS
1	A	95	LEU
1	A	110	MSE
1	A	113	LYS
1	A	114	GLU
1	A	116	LEU
1	A	133	TYR
1	A	148	ASP
1	A	150	ARG
1	A	166	ASN
1	A	167	SER
1	A	175[A]	GLU
1	A	175[B]	GLU
1	A	178	ARG
1	A	188	ARG
1	A	189	VAL
1	A	212	ASN
1	A	234	LEU
1	A	236	LEU
1	A	252	LEU
1	A	289	GLU
1	A	302[A]	ASP
1	A	302[B]	ASP
1	A	307	LEU
1	B	2	THR
1	B	3	LYS
1	B	6	LEU

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Mol	Chain	Res	Type
1	B	13	THR
1	B	36	LEU
1	B	54	VAL
1	B	56	VAL
1	B	57	LYS
1	B	68	THR
1	B	75	THR
1	B	82	SER
1	B	95	LEU
1	B	113	LYS
1	B	126	GLU
1	B	128	LYS
1	B	141	VAL
1	B	168	GLU
1	B	175	GLU
1	B	180	GLU
1	B	188	ARG
1	B	195	LEU
1	B	204	LYS
1	B	211	GLU
1	B	216	LYS
1	B	220	GLU
1	B	225	ASP
1	B	226	SER
1	B	232	ARG
1	B	234	LEU
1	B	254	THR
1	B	269	LEU
1	B	292	HIS
1	B	302	ASP
1	B	307	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	29	GLN
1	A	76	ASN
1	A	77	HIS
1	A	118	GLN
1	A	197	ASN
1	A	247	ASN
1	B	52	HIS

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Mol	Chain	Res	Type
1	B	76	ASN
1	B	89	ASN
1	B	99	ASN
1	B	197	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

### 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
2	BGC	A	1001	-	12,12,12	0.62	0	17,17,17	0.76	0
2	BGC	B	2001	-	12,12,12	0.74	0	17,17,17	0.76	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	BGC	A	1001	-	-	0/2/22/22	0/1/1/1
2	BGC	B	2001	-	-	1/2/22/22	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	2001	BGC	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	314/332 (94%)	0.12	3 (0%) 82 81	29, 43, 64, 77	0
1	B	315/332 (94%)	0.10	2 (0%) 89 88	30, 49, 65, 78	0
All	All	629/664 (94%)	0.11	5 (0%) 86 85	29, 46, 64, 78	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	53	LYS	3.5
1	A	75	THR	2.7
1	B	53	LYS	2.4
1	B	222	ALA	2.2
1	A	76	ASN	2.1

### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

### 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists the number of atoms with occupancy less than 0.9.



Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	BGC	B	2001	12/12	0.97	0.12	36,40,42,43	0
2	BGC	A	1001	12/12	0.98	0.14	32,37,39,39	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.